

SAN FRANCISCO PUBLIC LIBRARY



3 1223 10225 1874

bart impact program

THE IMPLICATIONS OF BART'S LAND USE AND URBAN DEVELOPMENT IMPACTS FOR THE TRANSPORTATION DISADVANTAGED

DEC 18 1978

DOCUMENTS DEPT.
S.F. PUBLIC LIBRARY



D
REF
388.42
B2813td

working paper

The BART Impact Program is a comprehensive, policy-oriented study and evaluation of the impacts of the San Francisco Bay Area's new rapid transit system (BART).

The program is being conducted by the Metropolitan Transportation Commission, a nine-county regional agency established by state law in 1970.

The program is financed by the U. S. Department of Transportation, the U. S. Department of Housing and Urban Development, and the California Department of Transportation. Management of the Federally funded portion of the program is vested in the U. S. Department of Transportation.

The BART Impact Program covers the entire range of potential rapid transit impacts, including impacts on traffic flow, travel behavior, land use and urban development, the environment, the regional economy, social institutions and life styles, and public policy. The incidence of these impacts on population groups, local areas, and economic sectors will be measured and analyzed. Finally, the findings will be interpreted with regard to their implications for the planning of transportation and urban development in the Bay Area and other metropolitan areas.

DOCUMENT NO. DOT-BIP-WP 56-10-78

CONTRACT NO. DOT-OS 30176

BART IMPACT PROGRAM

IMPLICATIONS FOR THE
TRANSPORTATION DISADVANTAGED PROJECT

THE IMPLICATIONS OF BART'S LAND USE
AND URBAN DEVELOPMENT IMPACTS
FOR THE TRANSPORTATION DISADVANTAGED

April, 1978

WORKING PAPER

Document is Available to the Public Through the
NATIONAL TECHNICAL INFORMATION SERVICE
SPRINGFIELD, VIRGINIA 22151

Prepared for

U.S. DEPARTMENT OF TRANSPORTATION

And

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
WASHINGTON, D. C.

The preparation of this report has been financed in part through a grant from the U.S. Department of Transportation, Urban Mass Transportation Administration, under the Urban Mass Transportation Act of 1974, as amended.

NOTICE

This document is disseminated under the sponsorship of the U.S. Department of Transportation and the U.S. Department of Housing and Urban Development in the interest of information exchange. The United States Government and the Metropolitan Transportation Commission assume no liability for its contents or use thereof.

DOCUMENT NO. DOT-BIP-WP 56-10-78
PREPARED BY URBAN DYNAMICS ASSOCIATES
UNDER CONTRACT WITH THE METROPOLITAN TRANSPORTATION
COMMISSION
FOR THE U.S. DEPARTMENT OF TRANSPORTATION
AND THE U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
UNDER CONTRACT DOT-OS 30176, TASK ORDER 10
BART IMPACT PROGRAM.

1. Report No. DOT-BIP-WP 56-10-78	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle THE IMPLICATIONS OF BART'S LAND USE AND URBAN DEVELOPMENT IMPACTS FOR THE TRANSPORTATION DISADVANTAGED		5. Report Date April, 1978	6. Performing Organization Code
7. Author(s) Robert Donnelly, Jesus Arguelles		8. Performing Organization Report No.	
9. Performing Organization Name and Address Urban Dynamics Associates 1045 Sansome Street Suite 302 San Francisco, California 94111		10. Work Unit No. Task Order No. 10	11. Contract or Grant No. DOT-OS 30176
12. Sponsoring Agency Name and Address U.S. Department of Transportation U.S. Department of Housing and Urban Development Washington, D.C.		13. Type of Report and Period Covered Working Paper	
14. Sponsoring Agency Code			
15. Supplementary Notes The Metropolitan Transportation Commission, Hotel Claremont, Berkeley, California 94705, is the prime contractor for the BART Impact Program. Urban Dynamics Associates is the subcontractor to MTC responsible for the Transportation Disadvantaged Project.			
16. Abstract <p>This report examines the land use and urban development impacts that the 71 mile Bay Area Rapid Transit System has had to date on the transportation disadvantaged. Three special population groups are the focus of analysis — ethnic minorities, the elderly and handicapped. These groups are of special concern for transportation planning and policy because of either low-income status or mobility related impairments.</p> <p>Findings are reported from the investigation of six issues related to BART's impacts for the transportation disadvantaged in terms of population distribution effects, residential location decisions, and station area neighborhood level impacts. Evaluation of these findings is made in the context of the level, nature, and degree of equity in the incidence of BART's economic impacts. Based on the findings of the study, the land use implications for the transportation disadvantaged of a regional rapid rail transit investment are presented in terms of policy considerations for other areas in which similar systems may be considered.</p>			
17. Key Words • Bay Area Rapid Transit (BART) • BART Impact Program (BIP) • Transportation Disadvantaged • Rapid Rail Transit • Land Use Impacts of Transportation		18. Distribution Statement Document is available to the public through the National Technical Information Service Springfield, Virginia 22151	
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 58	22. Price



Digitized by the Internet Archive
in 2015

https://archive.org/details/implicationsofb1978donn_1

SUMMARY AND CONCLUSIONS

Purpose of the Implications for the Transportation Disadvantaged Project (ITD)

The Implications for the Transportation Disadvantaged Project is a special study within the BART Impact Program included in order to develop the implications of BART's impacts for the transportation disadvantaged. The entire range of the impacts on the transportation disadvantaged related to the construction and operations of the San Francisco Bay Area Rapid Transit System are considered:*

- Environmental
- Mobility and Accessibility
- Economic, Employment and Financial
- Land Use and Urban Development.

This is the fourth and last interim report to be prepared in the ITD Project prior to the preparation of the Final Report. This report focuses on the land use and urban development impacts on the transportation disadvantaged associated with BART's introduction into the regional transportation system and economy of the San Francisco Bay Area.

*Urban Dynamics Associates. Implications of BART's Environmental Impacts for the Transportation Disadvantaged. BART Impact Program. Document No. DOT-BIP-TM 34-10-78. Metropolitan Transportation Commission, Berkeley. January, 1978.

Urban Dynamics Associates. Implications of BART's Mobility and Accessibility Impacts for the Transportation Disadvantaged. BART Impact Program. (Draft Technical Memorandum). Metropolitan Transportation Commission, Berkeley. December, 1977.

Urban Dynamics Associates. Implications of BART's Economic, Employment and Financial Impacts for the Transportation Disadvantaged. BART Impact Program. (Draft Technical Memorandum). Metropolitan Transportation Commission, Berkeley. December, 1977.

Urban Dynamics Associates. Implications of BART's Land Use and Urban Development Impacts for the Transportation Disadvantaged. BART Impact Program. (Working Paper). Metropolitan Transportation Commission, Berkeley. January, 1978.

Definition of Transportation Disadvantaged

The special population groups included in the ITD Project and in this report are:

- the elderly,
- the handicapped, and
- ethnic minorities (Blacks, Spanish-heritage, Asians and other minorities).

These groups are a special concern for transportation policy due to specific physical disabilities which limit mobility or due to general disadvantages vis a vis society, such as low income status.

Population Characteristics of the Transportation Disadvantaged

In the Greater BART Service Area (San Francisco, Alameda, Contra Costa and the northern portion of San Mateo County), ethnic minority persons constitute nearly one-third of the total population (31.9%); 12.7 percent Spanish-heritage, 11.8 percent Black, and 7.4 percent other. Within the Primary BART Service Area (132 zones from which 80% of all BART trips originate), ethnic minorities are found in greater concentrations; 13.6 percent Spanish-heritage, 14.3 percent Black, and 7.4 percent other. Over fifty percent (50.7%) of the Black population in the three county area live in census tracts within one-quarter mile of BART, forty percent (39.6%) of the Spanish heritage population.

Based on a classification criterion of more than forty percent (40%), eighteen (18) of the thirty-four (34) BART stations are located in areas (one-half mile radius) of high total ethnic minority concentration. Within the immediate station impact area (one-quarter mile) there are 41,293 persons living around stations located in non-downtown and 2,138 in downtown areas of high concentrations of ethnic minorities; 13,200 in non-downtown and 13,815 in downtown areas of low concentrations of ethnic minorities.

The elderly (65 years and older) constitute 9.7 percent of the total population residing within the Greater BART Service Area and 10.2 percent in the Primary BART Service Area. Handicapped persons appear to be generally evenly distributed in the BART service areas, with no identifiable concentrations revealed by census tract data. The elderly are also fairly evenly distributed throughout the BART service area; however, the greatest concentrations of older persons are found around downtown stations. Four of the eight station areas with high concentrations or elderly (greater than 15%) are located in downtown areas.

Issue Investigations: Conclusions

Six issues relating to the land use and urban development impacts of the BART system for the transportation disadvantaged are examined in this report. Information developed in the various project areas of the BART Impact Program has been applied in the evaluation of each issue.

ISSUE NUMBER ONE: "Has BART contributed to an increase in the concentration of ethnic minorities in the central cities?"

Conclusion: If BART were to substantially improve the accessibility of the outlying suburban areas of the region, it might be expected that it would significantly affect residential location decisions. A trend toward proportional increase in the ethnic minority population within the central city areas might be reinforced or accelerated as a result, since BART's related accessibility gains might largely affect the majority White population, given economic, social and other discriminatory barriers to suburban area relocation for ethnic minorities. There exists a substantial degree of ethnic minority residential concentration within San Francisco and Oakland and the observable trend indicated by 1960 and 1970 census data, shows that minority concentration is increasing in these central cities.

However, there is little indication that BART has measurably affected the regional distribution of population growth. Other development and residential location choice factors appear to be considerably more important in explaining population growth patterns and distribution in the Bay Area. Thus, while BART has not represented a major factor in countering the trend toward increased concentration of minorities in central cities, apparently it also has not been an important factor in encouraging suburban "white flight".

ISSUE NUMBER TWO: "Has BART encouraged middle-income minorities to move to suburban areas?"

Conclusion: As found in the investigation of Issue Number One, BART's overall impact on regional demographic changes in the Bay Area is apparently minimal. It is evident that BART is more of a consideration for those households who have moved to suburban locations than for those relocating in urban neighborhoods, given the greater accessibility gain provided by BART to outlying areas.

However, the limited data which are available do not indicate that BART has encouraged significant numbers of middle income minority central city residents to move to suburban locations. In fact, a greater rate of middle income White out-migration appears to be continuing. However, BART's influence on these moves is apparently not as important a factor as other variables explaining residential location choice.

ISSUE NUMBER THREE: "Has BART contributed to a physical upgrading of stations in minority areas by stimulating new construction, rehabilitation or remodeling of residences and businesses?"

Conclusion: BART's principal contribution to the physical upgrading of areas around stations has occurred where BART has either directly, or indirectly, affected public capital improvement expenditures, land use policies and regulations, or redevelopment planning. Direct public improvement expenditures around BART stations have been the most substantial in the downtown areas of San Francisco, Oakland and Richmond. Minor streetscape improvements were provided in the case of the Mission Street stations located in the predominantly Spanish-heritage community of San Francisco, using general obligation bond financing and with only limited success in the improvement of the neighborhood's physical setting.

New construction around BART stations cannot be attributed to BART, except in the case of two major public institutional projects built as part of the downtown redevelopment project located in Richmond with its high proportions of Black residents. In downtown San Francisco, the substantial new construction which has been observed since 1962 can be only indirectly attributed to BART. Little or no new office or housing construction appears to have occurred in other urban residential areas where ethnic minorities live in the greatest concentration. Additionally, BART has not, as of yet, induced increases in rehabilitation of existing housing stock or office space in these areas, where proportionately less rehabilitation has occurred around stations than areawide.

ISSUES NUMBER FOUR AND FIVE: "Has BART encouraged higher densities around stations which, in turn, lead to the displacement of minority and disadvantaged households?"

"Have BART's impacts on real estate values around stations, including speculation, affected residents in minority neighborhoods negatively?"

Due to the high degree of interrelationship between these two issues, they are examined together in this working paper.

Conclusion: Increased real estate values in the vicinity of BART stations would imply the heaviest burden on the elderly and lower-income households, many of which are ethnic minorities, living in rental units in low and moderate cost housing. At this point in the BART Impact Program studies, there is not sufficient evidence to determine if property values have increased substantially around station areas, including those with high concentrations of ethnic minority population subgroups, or that these changes, if they have occurred, are related to BART. A definitive conclusion to this issue must await the findings of the property value study of the Land Use and Urban Development Project. However, the record of actual construction activities around BART stations and the relatively small impact of BART on housing development and rehabilitation activity suggest that residential property values have not increased substantially around most non-downtown BART stations as a result of BART. BART's impact on property values is apparently the least in the older, mixed land use urban areas where ethnic minorities live in the greatest concentrations. The limited results of a study of BART's impacts on real estate values around three Oakland station areas supports this tentative conclusion. It is unlikely that subsequent studies will show that significant relocation of lower income tenants has occurred around BART stations as a result of inflation of residential property values related to BART's impacts on development market potential or land use policies.

ISSUE NUMBER SIX: "Has BART encouraged more shopping downtown at the expense of shopping districts in ethnic communities?"

Conclusion: Due to the greater accessibility gains provided by BART for commercial activities located in downtown areas, it might be expected that corresponding shifts in retail shopping patterns have occurred generally to the disadvantage of shopping areas

either not served, or served less well by BART. Older urban area commercial districts, such as the Mission in San Francisco where many ethnic minority owned and patronized businesses are located, might lose business to the downtown areas.

Despite the fact that many merchants perceive that BART is strengthening the vitality of the Oakland CBD, BART's impacts on commercial activity appear to have been relatively weak in overcoming other factors which inhibit shopping in the area, namely — development character and relatively poor auto access. In downtown San Francisco, there is indication that those consumers that use BART have increased their shopping in downtown San Francisco, but not necessarily at the expense of other areas. Since BART is used by a very small share of the general area population to shop, only about one percent of weekday shopping trips, its impact on the competitiveness of non-downtown shopping districts located in ethnic minority areas is probably relatively minor. A definitive conclusion to this issue must await the complete results of the Land Use and Urban Development Project study of BART's impact on retail sales.

TABLE OF CONTENTS

	<u>Page</u>
SUMMARY AND CONCLUSIONS	i
I. INTRODUCTION	I- 1
BART Impact Program	I- 1
Implications for the Transportation Disadvantaged Project (ITD)	I- 2
Purpose of This Report	I- 6
II. INVESTIGATION OF LAND USE AND URBAN DEVELOPMENT IMPACT ISSUES	II- 1
<u>Issue One: Impact on Central City Population Concentration</u>	II- 2
Expectations	II- 2
Concentration of the Transportation Disadvantaged Population	II- 2
Demographic Trends by Ethnic Composition of the Regional Population	II- 6
BART's Affect on Population Shifts	II- 8
Conclusion	II- 9
<u>Issue Two: Impact on Suburban Residential Location Decisions of Minorities</u>	II-10
Recap of BART's Impact on Regional Population Patterns	II-10
BART's Effect on Residential Location Choices of Middle Income Out-migrants of East Oakland	II-10
Conclusion	II-14
<u>Issue Three: Impact on Minority Neighborhood Revitalization</u>	II- 15
Public Expenditures and Redevelopment Activity Around Minority Station Areas	II-15
New Construction Around Minority Stations	II-16
Rehabilitation Activities Around Minority Stations	II-17
Conclusion	II-19

TABLE OF CONTENTS
(continued)

	<u>Page</u>
<u>Issues Four and Five: Impact on Minority Station Area Construction and Real Estate Values</u>	II- 21
Expectations	II- 21
Limitations of the Analysis	II- 21
Land Development Activity Around BART Stations	II-22
BART's Impact on Housing Densities	II-25
Preliminary Indications of BART's Impacts on Real Estate Values Around Stations	II-27
Conclusion	II-28
<u>Issue Six: Impact on Minority Shopping Districts</u>	II-30
Expectations and BART's Use for Shopping	II-30
Perceptions of Downtown Oakland Merchants	II- 31
Preliminary Results of Shoppers Survey	II- 31
Conclusion	II-32
 III. IMPLICATIONS	 III- 1
Magnitude of Rapid Rail's Potential Land Use Impacts	III- 1
Importance of Coordinated Development Planning and Policies	III- 2
 REFERENCES	

LIST OF TABLES

		<u>Page</u>
1-1	Change in Population Ethnic Composition: 1960-1970 for Central Areas and Other Parts of Four County BART Area (Percent Ethnic Group as Share of Place Population)	II- 7
2-1	Importance of BART in Residence Choice and Moves to Suburban vs. Urban Locations	II-12
2-2	Importance of BART in Residence Choice Among Middle Income White, Middle Income Black, and Other East Oakland Movers	II-13
3-1	Selected Case Study Areas: Summary of 1965-77 Station Area Land Use Changes	II-18
4-1	Station Area Construction 1965-77 Downtown, Low, and High Ethnic Minority Station Areas	II-23

LIST OF FIGURES

		<u>Page</u>
1-1	Spanish-Heritage Population Residential Clusters and the BART System	II- 3
1-2	Black Population Residential Clusters and the BART System	II- 4
1-3	Asian Population Residential Clusters and the BART System	II- 5

I. INTRODUCTION

BART Impact Program

Built at a cost of \$1.6 billion, BART is a major element in the Bay Area program of transportation development. As the first regional rapid transit system to be built in this nation in more than 50 years, BART is of great interest to the Bay Area, other metropolitan areas across the country that are considering investments in improved transportation, and to the federal government which is providing financial aid for transportation improvements, urban development and environmental protection. Considering the magnitude of these concerns, there is a great need for accurate information on the impacts on the Bay Area resulting from the BART investment. Analyses and interpretations of BART impacts can be of vital assistance to those responsible for future transportation policy decisions throughout the nation.

The United States Department of Transportation (DOT) and the Department of Housing and Urban Development (HUD) have sponsored and are funding a long-term, policy-oriented study and evaluation of the impact of the new 71-mile Bay Area Rapid Transit system (BART) in the San Francisco-Oakland metropolitan area. The program is being managed by the area's Metropolitan Transportation Commission (MTC). The program, initiated in 1972, is expected to be completed in 1978. Projects are being prepared by consulting firms, universities, research institutions, and public agencies working under contract with MTC and, in some cases, by MTC itself.

The BART Impact Program has been designed to cover the entire range of possible impacts associated with the construction and operation of the BART system. Six major project areas have served to organize evaluation of BART's impacts:

- Transportation System and Travel Behavior.
- Land Use and Urban Development.
- Economics and Finance.
- Environment.
- Public Policy.
- Institutions and Lifestyles.

Additionally, three special projects have been established to integrate the findings of the major project studies in order to focus on the important implications of the BART experience:

- Implications for the Transportation Disadvantaged.
- Federal Policy Implications.
- Local Policy Implications.

Implications for the Transportation Disadvantaged Project (ITD)

PURPOSE OF ITD PROJECT

The overall purpose of the Implications for the Transportation Disadvantaged Project has been to provide group-specific evaluation of the range of BART impacts studied in the BART Impact Program. The ITD study has been organized to address certain key questions about the effects of BART's construction and operations:*

- What impacts have occurred?
- Where are they occurring?
- Who is affected?
- Are the disadvantaged disproportionately affected?

SPECIAL POPULATION GROUPS STUDIED

In Phase I of the ITD Project, consideration was given to the question of which population groups constitute the transportation disadvantaged. ** The conclusion of this study was that only a tenuous case can be made that all members of any general population subgroup can be considered transportation

*Urban Dynamics Associates. Project Implementation Plan: Implications for the Transportation Disadvantaged Project. BART Impact Program. Document No. DOT-BIP-PD 30-10-77. November, 1977.

** McGuire, Chester. Who Are the Transportation Disadvantaged? BART Impact Program. Document No. DOT-BIP-WP 27-10-77. Metropolitan Transportation Commission, Berkeley, California. April, 1976.

disadvantaged solely by virtue of their membership in that group. However, since as a group — the poor, the elderly, ethnic minorities, women and youth evidence certain general disadvantages vis a vis society, or specific mobility-related disadvantages, these groups represent a special concern in transportation planning.

In order to provide a reasonable scope for the study, it was determined in Phase I that the focus of the ITD Project should be restricted to ethnic minorities, the elderly and handicapped.* The impacts of a new rapid rail transportation facility are of interest for these groups for similar, but somewhat distinct reasons. All three groups are typically characterized by lower income levels than the general population. Additionally, the reason to study BART's impacts on elderly and handicapped is their impaired mobility due to physical or other disabilities. Ethnic minorities are of special interest for the evaluation of a major public investment in terms of equity considerations, and because differences in culture, lifestyles, and economic status may influence the ways in which they are affected by impacts, perceive or respond to BART's facilities, operation, policies, financing and other effects.** Additionally, since BART was primarily designed to serve long distance travel from outlying sections of the Bay Area, an overall concern is the extent to which it also serves the special transportation needs of the disadvantaged population which is more likely to reside in the central cities of the region.

* McGuire, Chester. Implications for the Transportation Disadvantaged: Research Plan. BART Impact Program. Document No. DOT-BIP-PD 28-10-77. Metropolitan Transportation Commission, Berkeley. April, 1976.

** McGuire, Chester. The Special Study of Ethnic Minorities in the BART Impact Program. Document No. DOT-BIP-WP 28-10-77. Metropolitan Transportation Commission, Berkeley. April, 1976.

Ethnic Minorities

The ethnic groups studied in the ITD Project are those which makeup the three principal minority populations of the San Francisco Bay Area:

- Blacks,
- Spanish-heritage, and
- Asians (Chinese, Japanese and Filipinos).

Other minority groups are represented to a significantly lesser extent in the Bay Area population and include other orientals (e.g. Korean, Vietnamese) and Native Americans. Where data are available, persons in these groups are included in the analysis of BART impacts on the total minority population of the Bay Area. It has been an objective of the ITD Project to apply consistent definitions of specific ethnic minority groups in all analyses of BART's impacts. However, due to variations in the classification of data found in the many information sources used in the study, this has not always been possible and is noted in the discussion of specific impact analyses.

Elderly

The elderly population is defined to be those persons 65 years of age or older. This transportation disadvantaged group is of particular interest due to generally low-fixed annual incomes and high incidence of mobility impairing disabilities. It is estimated that over sixty-five percent of the non-institutionalized handicapped population in the United States are 65 years of age or older.*

* McGuire, Chester. Who Are the Transportation Disadvantaged? BART Impact Program. Document No. DOT-BIP-WP 27-10-77. Metropolitan Transportation Commission, Berkeley, California. April, 1976. Source: U.S. Department of Health, Education and Welfare, National Center for Health Statistics. 1969, Series 10, No. 78. December, 1972.

Handicapped

The ITD study's focus on the handicapped population is for those individuals with physical, mental or emotional disabilities which restrict or preclude use of conventional private or public transportation facilities. These include:

- Non-ambulatory disabilities,
- Semi-ambulatory disabilities,
- Functional disabilities,
- Sight and Hearing disabilities, and
- Developmental disabilities.

For the severely handicapped individual, there are often numerous problems in addition to the specific handicap itself: advanced age, low income, and lack of specific work skills or education.

SCOPE OF ITD PROJECT

Analyses of BART's impacts conducted in each of the six major project areas of the BART Impact Program are applied in the investigation of a set of twenty-four specified issues related to a range of potential impacts of BART on the transportation disadvantaged. Issue investigations are being conducted in four broad impact areas; an interim technical memorandum or working paper is to be prepared reporting the results of study in each work element of the ITD study:*

* Urban Dynamics Associates. Implications of BART's Environmental Impacts for the Transportation Disadvantaged. BART Impact Program. Document No. DOT-BIP-TM 34-10-78. Metropolitan Transportation Commission, Berkeley. January, 1978.

Urban Dynamics Associates. Implications of BART's Mobility and Accessibility Impacts for the Transportation Disadvantaged. BART Impact Program. (Draft Technical Memorandum). Metropolitan Transportation Commission, Berkeley. December, 1977.

Urban Dynamics Associates. Implications of BART's Economic, Employment and Financial Impacts for the Transportation Disadvantaged. BART Impact Program. (Draft Technical Memorandum). Metropolitan Transportation Commission, Berkeley. December, 1977.

Urban Dynamics Associates. Implications of BART's Land Use and Urban Development Impacts for the Transportation Disadvantaged. BART Impact Program. (Working Paper). Metropolitan Transportation Commission, Berkeley. January, 1978.

- Environmental
- Mobility and Accessibility
- Economic, Employment and Financial
- Land Use and Urban Development.

Purpose of This Report

This is the fourth and last interim ITD report examining the range of BART's impacts on the transportation disadvantaged. The overall objective of this report is to assess the extent of BART's land use impacts within areas of significant concentrations of the transportation disadvantaged, and to determine if these impacts on BART's regional land use impacts affect the special population groups differentially.

It is the purpose of the ITD study to identify the implications of the land use and urban development impacts of BART on the transportation disadvantaged. In order to draw these implications, a set of specific issue statements is examined using the best information available from the BART Impact Program. During Phase I of the ITD study, a number of land use issues were considered for inclusion within this report. After considerable review of completed and soon to be completed tasks within the six BIP project areas, a list of key land use issues were developed and are employed in this report as the focus of analysis. These six issues are investigated in Chapter II: "Investigation of Land Use and Urban Development Issues".

II. INVESTIGATION OF LAND USE AND URBAN DEVELOPMENT IMPACT ISSUES

In order to determine the implications of the land use and urban development impacts of BART for the transportation disadvantaged, six specific issues have been designated for investigation using information developed in the BART Impact Program; other BART studies; local planning studies; and primary demographic and socio-economic data sources where necessary.* The six land use issues examined are:

1. Has BART contributed to an increase in the concentration of ethnic minorities in the central cities?
2. Has BART encouraged middle-income minorities to move to suburban areas?
3. Has BART contributed to a physical upgrading of areas around stations in minority areas by stimulating new construction, rehabilitation, or remodeling of residences and businesses?
4. Has BART encouraged higher densities around stations, which in turn lead to the displacement of minority and disadvantaged households?**
5. Have BART's impacts on real estate values around stations, including speculation, affected residents in minority neighborhoods negatively?
6. Has BART encouraged more shopping downtown at the expense of shopping districts in ethnic communities?

*Urban Dynamics Associates. Project Implementation Plan: Implications for the Transportation Disadvantaged Project. BART Impact Program. Document No. DOT-BIP-PD 30-10-77. Metropolitan Transportation Commission, Berkeley. November, 1977.

**Due to the high degree of interrelationship between Issue Four and Issue Five, these two are examined together in this report.

Has BART contributed to an increase in the concentration of ethnic minorities in the central cities?

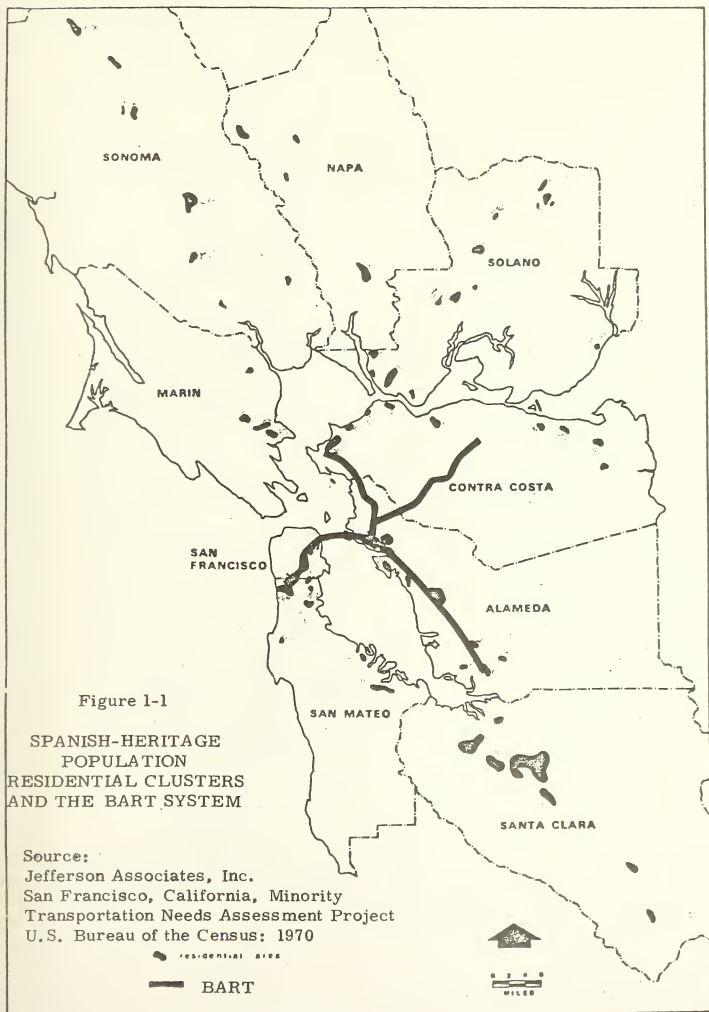
Expectations

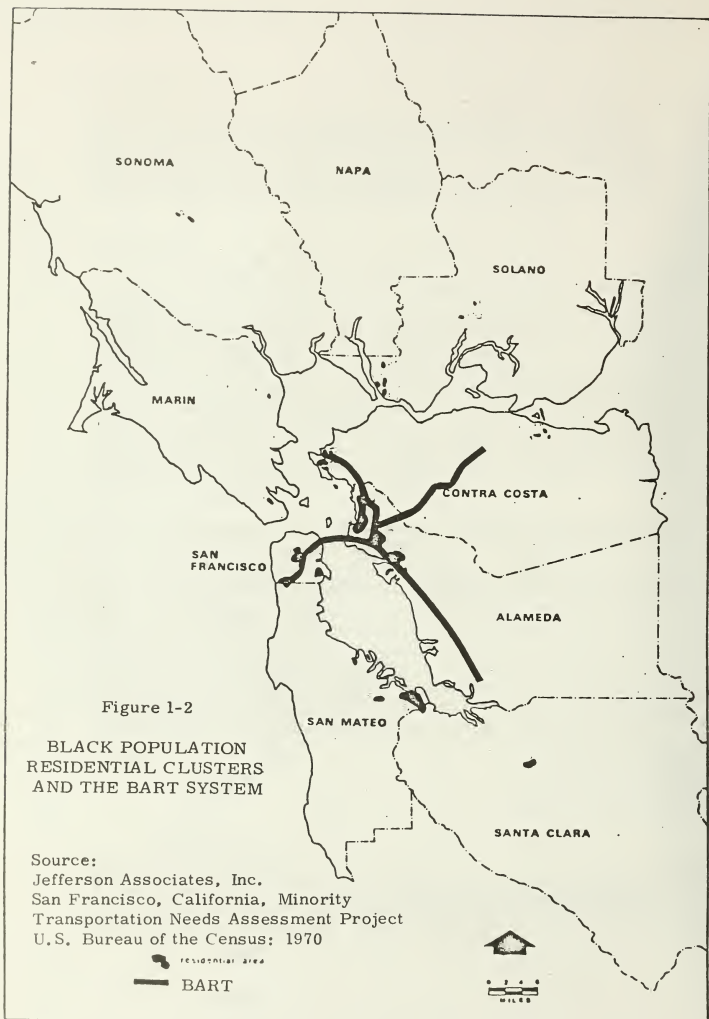
This hypothesis is based on the expectation of BART's direct impact on regional accessibility changes and indirect effect on residential location decisions. A proportional increase in ethnic minority population representation in central city areas could possibly be encouraged by BART due to increased incentives for "white flight" to suburban areas. This expectation reflects the assumption that BART's accessibility gains are sufficiently important to influence accelerated suburbanization and that due to economic, social and other discriminatory barriers, the ethnic minority population is less likely to respond to these changes in their residential location choices.

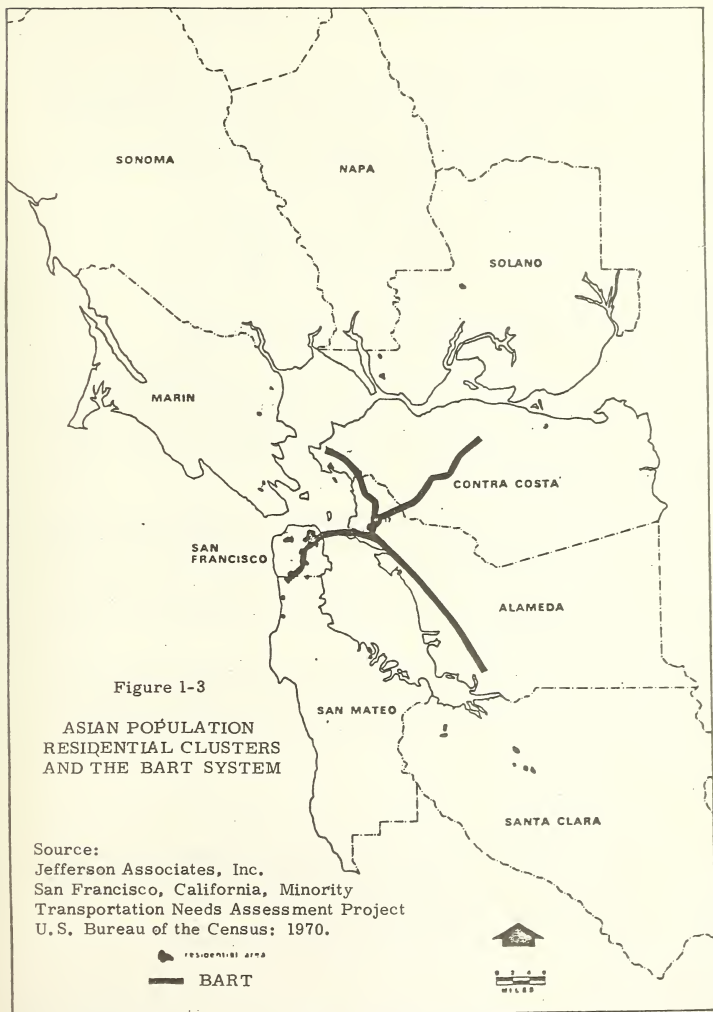
Concentration of the Transportation Disadvantaged Population

The ethnic minority population of the nine-county Bay Area region lives in the greatest concentration in the older areas of the central cities of the region. Settlement patterns of the three principal ethnic minority groups of the region — Spanish-heritage, Black and Asian — show a fairly substantial degree of clustering and group-specific differentiation within the region. This pattern and the relation of the concentrations of ethnic minority residential populations is illustrated in Figures 1-1, 1-2, and 1-3.* Within the central cities, the residential clusters of ethnic minorities are

* Jefferson Associates, Inc. Minority Transportation Needs Assessment Project: Phase I Report. Metropolitan Transportation Commission, Berkeley. November, 1977.







characterized by the highest residential density and absolute population size. In the four county area served by BART (San Francisco, Alameda, Contra Costa and San Mateo*), the share of the area's population in each principal minority group who lived in either the City of San Francisco or the City of Oakland is substantially greater than for majority Whites:**

Asian	71.7%
Black	67.9
Spanish-heritage	39.0
Other	29.1

Demographic Trends by Ethnic Composition of the Regional Population

No comprehensive population data exist to indicate changes which have occurred in the distribution of the Bay Area's population by ethnic category since the beginning of BART's operation. Table 1-1 illustrates the key demographic trends which were experienced in the pre-BART period between 1960 and 1970 in the region. These include:

- increasing regional population, with slight decrease in total central city area population, and relatively rapid suburban population growth;
- greatest total regional population growth among ethnic minority groups; and
- increasing concentration of ethnic minorities in the central city areas.

These trends reflect the interaction of differential fertility, immigration, out-migration and intra-regional migration rates among the ethnic groups of the area. During this period, substantial increases in regional accessibility were achieved with

* The southern portion of San Mateo County is not part of the Greater BART Service Area. However, all of San Mateo County is included here due to availability of comparable population data by ethnic category at the county level only.

** U.S. Census of Population and Housing: 1970.

Table 1-1

CHANGE IN POPULATION ETHNIC COMPOSITION: 1960-1970 FOR CENTRAL AREA
AND OTHER PARTS OF FOUR COUNTY BART AREA
(Percent Ethnic Group as Share of Place Population)

Ethnic Category (Race)	San Francisco		Oakland		Balance of Area		Four County BART Area ^a	
	1960	1970	1960	1970	1960	1970	1960	1970
White ^b	81.6%	71.4%	73.6%	59.1%	93.4%	90.5%	87.0%	81.9%
Black	10.0	13.4	22.7	34.5	3.9	5.7	8.5	11.2
Asian	7.9	13.6	3.2	4.8	1.7	2.6	3.8	5.3
Other	0.4	1.5	0.5	1.6	0.9	0.9	0.7	1.1
All Persons	(740, 316)	(715, 674)	(367, 568)	(361, 551)	(1, 394, 058)	(1, 826, 246)	(2, 501, 942)	(2, 903, 481)
Percent Change 1960 to 1970	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	--	-3.3%	--	-1.6%	--	+31.0%	--	+16.0%

^a San Francisco, Alameda, Contra-Costa and San Mateo County.

^b Includes Spanish-language and Spanish-surname persons.

Comparable U.S. Census data on Spanish-heritage persons for 1960 and 1970 does not exist.

Source: Urban Dynamics Associates. 1960 and 1970 U.S. Census of Population and Housing.

the expansion of the region's transportation facilities, and in particular, its freeway system.

BART's Affect on Population Shifts

A major limitation in the analysis of BART's possible affect on the demographic trends which occurred in the pre-BART 'Sixties', is the lack of post-BART population data for ethnic minorities by sub-regions of the Bay Area. It seems likely that the general trend toward increasing minority concentration in the central city areas is continuing, but that while BART has not countered this trend, it probably has not accelerated it either, given its relatively minor impact on regional accessibility and housing decisions.

In Work Element 10 of the Land Use and Urban Development Project, it has been determined that available land use modeling techniques (PLUM)* are not sufficiently sensitive to the relatively small changes in regional accessibility provided by BART in order to simulate or predict BART's impacts on the geographic distribution of regional population and employment.** Furthermore, this same study has concluded that changes in transit travel times attributable to BART's operation have had apparently no measurable affect to date on the regional distribution of population or employment. At specific locations, where BART has significantly reduced average transit travel times, the impact of this increased transit accessibility on the growth of population appears to have been negligible, to date.

Based on the analysis of the survey results of a panel of approximately 300 workers in downtown San Francisco and Oakland, structured such that around one-half were BART users, the Land Use and Urban Development Project has examined the importance of BART in the residential location choice.*** Responses of this

* Projective Land Use Model: A family of computer based land use models developed jointly by MTC and ABAG.

** Metropolitan Transportation Commission. Land Use Modeling Project: Stage I Findings and Stage II Implementation Plan. BART Impact Program. July, 1977.

*** John Blayney Associates/David M. Dornbusch & Co., Inc. Study of Workers' Locational Decisions. BART Impact Program. Document No. DOT-BIP-WP 38-5-77. Metropolitan Transportation Commission, Berkeley. November, 1977.

sample indicate that other reasons for changes in residential location than BART were considerably more important in most move decisions, and references to BART as a factor were negligible.

The selection criteria for this panel generated a sample for which BART's affects would be measurable even if, as researchers anticipated, they were to be relatively small. The fact that all respondents are persons working in the downtown areas of the region where BART serves travel needs better than elsewhere, and that a disproportionately high percentage of the panel are BART riders, clearly indicates that the influence of BART in residential decisions is overstated by this sample of the region's population. Approximately 20 percent of the respondents who indicated that they had moved in the past two years cited BART as one of the major considerations affecting housing location preference, 20 percent stated BART was a minor consideration, and 60 percent indicated that BART was not a consideration. No significant variation is found in these data for socio-economic characteristics of workers — income, occupation, age, education, sex or minority status.

Conclusion

If BART were to substantially improve the accessibility of the outlying suburban areas of the region, it might be expected that it would significantly affect residential location decisions. A trend toward proportional increase in the ethnic minority population within the central city areas might be reinforced or accelerated as a result, since BART's related accessibility gains might largely affect the majority White population, given economic, social and other discriminatory barriers to suburban area relocation for ethnic minorities. There exists a substantial degree of ethnic minority residential concentration within San Francisco and Oakland and the observable trend indicated by 1960 and 1970 census data shows that minority concentration is increasing in these central cities.

However, there is little indication that BART has measurably affected the regional distribution of population growth. Other development and residential location choice factors appear to be considerably more important in explaining population growth patterns and distribution in the Bay Area. Thus, while BART has not represented a major factor in countering the trend toward increased concentration of minorities in central cities, apparently it also has not been an important factor in encouraging suburban "white flight".

Has BART encouraged middle-income minorities to move to suburban areas?

Recap of BART's Impact on Regional Population Patterns

This issue is closely related to the investigation of Issue Number One, in which no major impact on the overall changing geographic distribution of the Bay Area population could be attributed to BART. BART, as a factor in the residential location decisions of the panel of downtown workers surveyed in the Land Use and Urban Development Project study, was found to be considerably less important than other residential development factors or household requirements and preferences.* Perhaps as the result of a relatively small sample size in this analysis, no significant statistical differences were found for various socio-economic attributes of the sample studied, including minority status.

BART's Effect on Residential Location Choices of Middle Income Out-migrants of East Oakland

In Work Element 3 of the Land Use and Urban Development Project, this issue will be directly investigated with the analysis of a survey of households which have experienced recent residential moves. The hypothesis that "BART has stimulated moves from older urban areas by middle income White families and by middle income minority group members" will be tested. In order to test this hypothesis, a survey of a random sample of households who moved in 1975-76 into Walnut Creek or the Mission District and households who moved out of East Oakland was conducted. These three case study areas were selected in order to represent a range of demographic and land use characteristics of residential areas in the

* John Blayney Associates/David M. Dornbusch & Co., Inc. Study of Workers' Locational Decisions, BART Impact Program. Document No. DOT-BIP-WP 38-5-77. November, 1977.

BART service area. All of these areas are served by BART, but it has been found that BART's accessibility gains have been greater in the outlying suburban areas, such as in the Walnut Creek case study area as compared to the Mission District or East Oakland case study areas.* Preliminary results of this study are available and included in this discussion.**

As shown in Table 2-1, of those in the sample of movers, BART was at least a consideration in the location of new residence for a large majority of households moving to suburban Walnut Creek (61.3%). For those in-migrating to the older urban Mission District, an area of predominantly Spanish-heritage population, substantially fewer households cited BART as a consideration in the choice of residential location (39.6%). Similarly, BART was considered a factor by about only one-third of urban East Oakland emmigrants — moving either to suburban or other urban locations.

In Table 2-2, variations in the importance of BART in the residence choice of the 35 East Oakland out-movers are analyzed for middle income White, middle income Black and other households. Due to the small sample size, it cannot be determined if the somewhat greater importance of BART that is apparent in the residential choice of middle income out-migrants (both Black and White) is significantly different from BART's importance for the "other" category.

However, it is interesting to note that in the City of Oakland, where only approximately half the population is White, three times as many middle income Whites as middle Income Blacks, in the samples, are out-migrating, regardless of BART's affect. These data do not suggest that a substantial out-migration from central city areas of middle income minority households is occurring, or that, for

*For a discussion of BART's accessibility impacts see: Urban Dynamics Associates. Implications of BART's Mobility and Accessibility Impacts for the Transportation Disadvantaged. BART Impact Program. Document No. DOT-BIP-TM 35-10-78. March, 1978.

**John Blayne Associates/David M. Dornbusch & Co., Inc., A Joint Venture. Study of Household Decisions. Working Paper. February, 1978.

Table 2-1

IMPORTANCE OF BART IN RESIDENCE CHOICE AND
MOVES TO SUBURBAN VS. URBAN LOCATIONS

	BART A Consideration in Residence Choice		BART Not A Consideration in Residence Choice	
	Number	Percent	Number	Percent
Mission District (urban) In-Migrating	42	39.6%	64	60.4%
Walnut Creek (suburban) In-Migrating	106	61.3	67	38.7
East Oakland (urban) Out-Migrating				
•to Suburban Locations	3	33.3	6	66.7
•to Urban Locations	7	26.9	19	73.1

Source: John Blayne Associates, Tyler Research Associates. Preliminary tabulations:
Work Element 3, Land Use and Urban Development Project. BART Impact Program.
January, 1978.

IMPORTANCE OF BART IN RESIDENCE CHOICE AMONG MIDDLE
INCOME WHITE, MIDDLE INCOME BLACK,
AND OTHER EAST OAKLAND MOVERS

	Importance of BART in Residence Choice					
	Major Consideration		Minor Consideration		Not A Consideration	
	Number	Percent	Number	Percent	Number	Percent
East Oakland Out-Migrants						
• Middle Income White	2	11.8	4	23.5	11	64.7
• Middle Income Black	2	33.3	0	0.0	4	66.7
• Other	1	8.3	1	8.3	10	83.3
	5		5		25	

Source: John Blayney Associates, Tyler Research Associates. Preliminary tabulations:
Work Element 3, Land Use and Urban Development Project. BART Impact Program.
January, 1978.

those families that are out-migrating, BART is a major consideration precipitating the change in residence decision.

Conclusion

As found in the investigation of Issue Number One, BART's overall impact on regional demographic changes in the Bay Area is apparently minimal. It is evident that BART is more of a consideration for those households who have moved to suburban locations than for those relocating in urban neighborhoods, given the greater accessibility gain provided by BART to outlying areas. However, the limited data which are available do not indicate that BART has encouraged significant numbers of middle income minority central city residents to move to suburban locations. In fact, a greater rate of middle income White out-migration appears to be continuing. However, BART's influence on these moves is apparently not as important a factor as other variables explaining residential location choice.

Has BART contributed to a physical upgrading of stations in minority areas by stimulating new construction, rehabilitation or remodeling of residences and businesses?

This issue is examined in light of the case study findings of the Public Policy Project and the Land Use and Urban Development Project. Seven Program-Wide Case Study areas representing differing population and urban development characteristics have served as the principal focus for the analysis. These have included two urban core areas, three urban residential areas and two suburban residential areas with varying ethnic minority compositions.

Public Expenditures and Redevelopment Activity Around
Minority Station Areas

BART's principal impacts on changes in land use around station areas have occurred where BART has either directly or indirectly affected public capital improvement expenditures, land use policies and regulations, or redevelopment project planning and financing. Based on the analysis of the Public Policy Project, it appears that while BART may have affected the timing and priorities of some local improvement projects, e. g., downtown San Francisco Market Street Beautification Project, its most significant impact on local capital projects was to provide an opportunity to use new funding approaches that, without BART, would not have been used.* This effect is illustrated by the use of tax increment bond financing in the case of the Embarcadero station area development in San Francisco. Also, the use of BART construction expenditures as a source of local credit permitted the City Center Project in Oakland to substantially expand the scope of the project**

* Booz, Allen & Hamilton. The Impact of BART on Local Government Expenditures, Revenues and Financial Policies. (Draft Working Paper). July, 1977.

** Booz, Allen & Hamilton. The Impact of BART on Land Use and Urban Development Policy. (Draft Working Paper). September, 1977.

The Market Street Beautification Project's \$24 million bond referendum, including \$500,000 for station area improvements at the 16th Street and 24th Street Mission Street stations, would probably not have been approved by the voters without BART.* In the case of Richmond, BART enabled the City to finance an expanded downtown redevelopment project with non-cash credits generated by BART's construction.**

The limited number of case studies conducted in the Public Policy Project indicate that public capital improvements associated with BART's planning, construction or financing have been the most significant in the downtown areas of the central Cities of San Francisco, Oakland, and in the downtown area of outlying Richmond. In both the urban residential case study areas of Rockridge (a low concentration ethnic minority area) and the Mission District (a high ethnic minority concentration area), the extent of potential redevelopment activity and improvements expenditures has been reduced by successful community opposition to anticipated intensive station area development.*** Plaza features and sidewalk improvements around the Mission Street stations have proved to be a limited success providing for the physical upgrading of the area, given ongoing maintenance problems and inadequacies of design concept.****

New Construction Around Minority Stations

Preliminary findings of the Land Use and Urban Development Project indicate that BART's impact on the regional pattern of housing

*The incorporation of the 12th Street BART station permitted the addition of \$2 million in local matching funds to this federally assisted redevelopment project, increasing the project from \$4 million to \$24.5 million in size.

**Booz, Allen & Hamilton. The Impact of BART on Local Government Expenditures, Revenues and Financial Policies. (Draft Working Paper). July, 1977.

***John Blayney Associates/David M. Dornbusch & Co., Inc. Program-Wide Case Studies: Findings to Date. BART Impact Program. Working Note. December, 1977.

****Gruen Associates, Inc. Indirect Environmental Impact. BART Impact Program. Draft Technical Memorandum. Metropolitan Transportation Commission, Berkeley. January, 1977.

and office construction has been less than originally expected by BART planners.* New construction in urban residential areas, where ethnic minorities live in greatest concentration has been minimal. In suburban areas, where ethnic minority representation is lower, more new construction has occurred in the path of urban development. However, BART's influence has been only one, and a relatively minor one, in the explanation of most new development.**

Table 3-1 summarizes the land use changes which have occurred since 1965 around the selected case area stations studied in the Land Use and Urban Development Project. Within 1,500 feet of both the 16th Street and 24th Street Mission District stations, new construction in the past twelve years has occurred on only 6.2 acres of the approximately 325 acres studied around the two stations. Within the vicinity of the Richmond station, institutional uses represent 11.3 acres of the 18.6 acres which have experienced new construction (the Social Security Building and the Kaiser Clinic). The area adjoining the Richmond station remains largely vacant. Considerably more construction, largely office and commercial, has occurred in the vicinity of the Walnut Creek and Fremont suburban stations. However, it is a preliminary conclusion of the Land Use and Urban Development Project that the suburban increase in the share of regional office construction since 1965 is apparently not directly attributable to BART.***

Rehabilitation Activities Around Minority Stations

Analysis of bank disclosure statements of home improvement loans by census tract conducted by the Land Use and Urban Development Project, indicate that housing rehabilitation activity around BART stations located within urban areas in San Francisco, Oakland and

* John Blayney Associates/David M. Dornbusch & Co., Inc. Interim Report: Project Findings to Date. BART Impact Program. Working Note. November, 1977.

** For more discussion of land development activity around BART Stations in minority areas, see Issues Four and Five.

*** John Blayney Associates/David M. Dornbusch & Co., Inc. Study of the Office Construction Industry. BART Impact Program. Document No. DOT-BIP-WP 12-8-77. August, 1977.

Table 3-1

SELECTED CASE STUDY AREAS:
SUMMARY OF 1965-77 STATION AREA LAND USE CHANGES^a

Urban Residential/High Minority Suburban/Low Minority

	Mission Street	Richmond	Fremont	Walnut Creek
Percent Total Ethnic Minority (Station area population) ^b	(24th St.) (16th St.) 54.6% & 59.6%	45.9%	17.2%	8.5%
New Construction (Acres)				
• Single Family Residential	--	0.1	--	1.7
• Multi-Family Residential	--	--	--	1.6
• Commercial & Office	2.5	3.6	35.9	23.4
• Institutional & Government	2.2	11.3	8.6	5.8
• Industrial	.2	--	--	--
• Parking ^c	1.3	2.7	--	0.4
TOTAL	6.2	17.7	44.5	32.9
Demolition-No Redevelopment (Acres)				
• Residential	1.3	5.2	4.6	1.9
• Non-Residential	2.4	2.8	--	0.7
	3.7	8.0	4.6	2.6

^a Station land use analysis area includes all land within 1500 feet of a BART station (162.3 acres).

^b 1970 population within one-half mile of station. McGuire, Chester. Who Are the Transportation Disadvantaged. Document No. DOT-BIP-WP 27-10-77. April, 1976.

^c Includes only land solely devoted to parking; all other land used for parking is assigned to the principal use category, commercial or office, industrial, etc., that parking serves.

Source: John Blayney Associates/David M. Dornbusch & Co., Inc. Program-Wide Case Studies: Findings to

Richmond, is far less than in similar areas one to three miles away.* Home improvement loan activity in the immediate Mission and Richmond station areas was one-third that of the larger neighborhood average. Rehabilitation activity in Oakland's Fruitvale station area was only one-sixth the areawide average in the larger Fruitvale District. In the mixed land use areas, BART apparently does not offer sufficient incentives for overcoming other factors which inhibit substantial residential rehabilitation.

A similar pattern of low and declining rehabilitation around BART stations was found in the study of office construction industry.** In both downtown San Francisco and Oakland, the analysis shows a clear decrease in the share of both major (\$100,000 or more) and minor (less than \$100,000) alterations and additions around BART stations with respect to total office rehabilitation activity in the two central city downtown areas. Similarly, the case studies indicate that only minimal office rehabilitation activities have occurred within the vicinity of the Mission Street stations in this non-downtown commercial district where the ethnic minority population concentration is high. The lack of rehabilitation activity around BART stations, particularly in the more marginal commercial urban residential areas, may indicate a "wait-and-see" attitude on the part of property owners in light of BART's, as of yet uncertain, impacts on real estate values.

Conclusion

BART's principal contribution to the physical upgrading of areas around stations has occurred where BART has either directly, or indirectly, affected public capital improvement expenditures, land use policies and regulations, or redevelopment planning. Direct public improvement expenditures around BART stations have been the most substantial in the downtown areas of San Francisco, Oakland and Richmond. Minor streetscape improvements were provided

* John Blayney Associates/David M. Dornbusch & Co., Inc. Study of the Housing Industry. BART Impact Program. Document No. DOT-BIP-WP 37-5-77. September, 1977.

** John Blayney Associates/David M. Dornbusch & Co., Inc. Study of the Office Construction Industry. BART Impact Program. Document No. DOT-BIP-WP 12-8-77. August, 1977.

in the case of the Mission Street stations located in the predominantly Spanish-heritage community of San Francisco, using general obligation bond financing and with only limited success in the improvement of the neighborhood's physical setting.

New construction around BART stations cannot be attributed to BART, except in the case of two major public institutional projects built as part of the downtown redevelopment project located in Richmond with its high proportions of Black residents. In downtown San Francisco, the substantial new construction which has been observed since 1962 can be only indirectly attributed to BART. Little or no new office or housing construction appears to have occurred in other urban residential areas where ethnic minorities live in the greatest concentration. Additionally, BART has not, as of yet, induced increases in rehabilitation of existing housing stock or office space in these areas, where proportionately less rehabilitation has occurred around stations than areawide.

ISSUES NUMBER FOUR AND FIVE

Has BART encouraged higher densities around stations, which in turn lead to the displacement of minority and disadvantaged households?

Have BART's impacts on real estate values around stations, including speculation, affected residents in minority neighborhoods negatively?

Due to the high degree of interrelationship between these two issues, they are examined together in this working paper.

Expectations

These issues relate to the expectation that the location of a BART station within existing built-up urban areas would induce greater residential densities and/or encourage higher land use development in general, including office, retail or manufacturing uses. As a result of a combination of land use planning policies and market forces responding to BART's implied accessibility improvements, initial expectations were that substantial land use changes and property value impacts would occur around stations. Increases in property values and rents resulting from expectations of potential redevelopment activity, speculation or actual changes in the land use character of station areas induced by BART could displace lower and middle income homeowners and renters, of which ethnic minorities and the elderly constitute a significant share.

Limitations of the Analysis

The most relevant source of information to the investigation of this issue is Work Element 13: "Study of Property Values and Rents" of the Land Use and Urban Development Project (LU & UD) of the BART Impact Program.* The objectives of this element of the

* John Blayney Associates and David M. Dornbusch & Co., Inc. BART's Impacts on Property Values and Rents. Working Paper. Submission Date: May 13, 1978.

LU & UD Project is to 1) determine BART's impacts on property values and rents; and 2) synthesize and interpret the findings to determine the effect of property value and rent changes on the population distribution of the Bay Area. Assessors' and recorders' files will be analyzed for changes in property values within areas surrounding BART stations. Since the results of this study are not available at the time of preparation of this report, analysis of this issue relies on the best available indicators of BART's impacts on station area densities and property values — the observed extent of overall construction activities within BART station areas, the findings of the studies of BART's impacts on office and housing location and development, and a limited study of BART's impacts on real estate values around four stations.

Land Development Activity Around BART Stations

Based on comparative analysis of aerial photographs taken in 1965 and 1977 and other data, the Land Use and Urban Development Project has identified land use changes which have occurred in the immediate vicinity (within 1,500 feet) and in the larger area around BART stations (4,000 feet by 4,000 feet square area centered on each station). *

At this point in the LU & UD Project, no attempt has been made to determine whether BART has either directly or indirectly caused any of these changes. However, to the extent that the land use changes around BART stations have not been significant or have been less than in other parts of the Bay Area, it may be tentatively concluded that BART has not induced the intensity of land use development that would dramatically increase real property values or taxes on assessed valuation around most stations.

Table 4-1 shows the number and type of new land use developments which occurred between 1965 and 1977 around BART stations located in the 1) downtown areas of San Francisco, Oakland and Berkeley; 2) areas of low ethnic minority concentration; and 3) areas of high ethnic minority concentration. These data indicate that with the

* John Blayney Associates and David Dornbusch & Co., Inc. Station Area Land Use, Document No. DOT-BIP-WP 39-5-77. November, 1977.

Table 4-1

STATION AREA CONSTRUCTION: 1965-1977
DOWNTOWN, HIGH AND LOW ETHNIC MINORITY
STATION AREAS

	Total Number of New Buildings and Facilities		
	Within 1, 500 ft.	Balance of Station Area	Total Station Area
DOWNTOWN STATIONS			
Downtown Station Areas			
* 12th Street/Oakland	34	10	44
* Montgomery	14	12	26
* Embarcadero	29	2	31
Berkeley	23	10	33
19th Street/Oakland	36	16	52
Civic Center	13	14	27
Powell	22	11	33
	<u>171</u>	<u>75</u>	<u>246</u>
Average Per Station Per Year	2.04	.89	2.93
NON-DOWNTOWN STATIONS			
Station Areas with Low Concentrations of Total Ethnic Minorities ^a			
Concord	18	41	59
Pleasant Hill	23	52	75
Walnut Creek	63	52	115
Lafayette	16	9	25
Orinda	9	6	15
Rockridge	12	2	14
El Cerrito del Norte	67	152	219
El Cerrito Plaza	13	6	19
Fremont	21	18	39
South Hayward	209	33	242
Bay Fair	12	11	23
San Leandro	13	18	31
	<u>476</u>	<u>398</u>	<u>874</u>
Average Per Station Per Year	3.31	2.76	6.07

(Continued)

Table 4-1 (continued)

	Total Number of New Buildings and Facilities		
	Within 1, 500 ft.	Balance of Station Area	Total Station Area
<u>Station Areas with High Concentrations of Total Ethnic Minorities</u>			
Richmond	22	7	29
North Berkeley	2	-	2
Ashby	17	11	28
Union City	11	92	103
Hayward	14	7	21
Coliseum	6	17	23
Fruitvale	33	14	47
Lake Merritt	26	23	49
MacArthur	25	24	49
Oakland West	26	19	45
Daly City	11	7	18
Balboa Park	16	8	24
Glen Park	54	50	104
24th Street/ Mission	22	5	27
16th Street/ Mission	17	5	22
	<u>302</u>	<u>289</u>	<u>591</u>
Average Per Station Per Year	1.68	1.61	3.28

* High concentrations of Ethnic Minorities; i.e. greater than 40 percent of total station area population within one-half mile.

^a Total ethnic minority population of less than forty percent population within one-half mile of BART station. 1970 U.S. Census of Population. McGuire, Chester. Who Are the Transportation Disadvantaged? Working Paper. April, 1976.

Source: John Blayney Associates. Based on 1965 and 1977 aerial photographs taken of a 4,000 feet by 4,000 feet square area contained on each BART station. John Blayney Associates and David M. Dornbusch & Co., Inc. Station Area Land Use. Working Paper. November, 1977. (Revised Table December, 1977.)

exception of a few station areas, Union City, Walnut Creek, El Cerrito del Norte and South Hayward, relatively little construction has occurred around station areas located outside the downtown areas of the region. Three of these four exceptions are all located in suburban areas with predominantly low ethnic minority populations.* The average number per station area of new buildings or facilities constructed per year is only 3.28 in areas of high ethnic minority concentration, compared to 6.07 in areas of low minority concentration. The record of actual construction activity outside the downtown areas suggests that substantial land use changes resulting in higher use categories and values, have not occurred to the extent that may have been expected around BART stations located within the built-up urban areas where large ethnic minority populations are found.

The relatively small number of units of new construction which are shown for downtown station areas greatly understates the land use and real estate value impacts associated with the extensive high-rise office construction which has occurred during this twelve year period. Three of the seven downtown station areas had concentrations of ethnic minorities exceeding 40 percent of the 1970 population living within one-half mile of a BART station. These impacts have clearly affected downtown minority residents, however, BART's role in the development which has occurred is not clear.

BART's Impact on Housing Densities

Increased assessed valuation of residential property would be most directly related to BART's potential inducement of higher density new housing construction or increased rehabilitation of the existing housing stock around station areas. The findings of the LU & UD Project study of BART's impacts on the housing industry of the Bay Area are relevant in this context.** Hypotheses tested in this

* Union City is classified as a station area of high ethnic minority concentration in the ITD Project, however, total population around this downtown station is very small.

** John Blayney Associates and David M. Dornbusch & Co., Inc. Study of the Housing Industry. Document No. DOT-BIP-WP 37-5-77. (Draft). September, 1977.

study are related to either the potential direct impacts of BART on development market demand, or indirect impacts on development potentials operating through BART-related public policy, regulations, or redevelopment programs.

The Land Use and Urban Development Project has found that the apartment market remains strongly automobile oriented and does not recognize access to transit facilities as a premium amenity. As a result, BART has not induced residential construction as a higher density around station areas than would have occurred without BART. The high ethnic minority areas around the Fruitvale, Daly City, Richmond, Mission and West Oakland stations have experienced only a few isolated cases of residential construction. These have not constituted higher density residential developments resulting from BART.

Rezoning to permit higher density residential development around station areas as a result of BART could be expected to raise property owners expectations and thus inflate land prices. Of the thirty-four BART station areas, land use policies changes between 1965 and 1975 have resulted in less restrictive controls (upzoning) for eighteen station areas, seven of which have high concentrations of ethnic minorities.* Two of these are CBD station areas. Six of the eight station areas experiencing more restrictive land use policies limiting BART's potential real estate impact are in urban residential areas of high ethnic minority concentration.

The Mission District of San Francisco, with its large Latino population, organized neighborhood opposition, defeated a redevelopment-renewal program and achieved zoning changes which reduced height limits at both the 16th Street and 24th Street stations.** The Mission District experience, is an example of a case in which the perceived

* Gruen Associates, Inc. Indirect Environmental Impact, BART Impact Program. Draft Technical Memorandum. Metropolitan Transportation Commission, Berkeley. January, 1977.

** Booz, Allen & Hamilton. The Impact of BART on Land Use and Urban Development. (Draft Working Paper). September, 1977. Jefferson Associates, Inc. Impacts of BART on Bay Area Political Institutions. BART Impact Program. Document No. DOT-BIP-TM 32-6-77. May, 1977.

"external" threat of BART can be seen to have directly stimulated community support and agitation for conservation and anti-development land use control policies. In another case study area of the Land Use and Urban Development Project, it was found that in the Richmond station area, with a large Black population concentration, that the limited residential development which has occurred cannot be attributed to BART, and that rehabilitation activity is negligible. *

In the older built-up areas of San Francisco, Oakland and Richmond, rehabilitation activities in neighborhoods adjacent to BART stations is considerably lower than in comparable areas one to three miles away. Because of the mixed land use character of many urban minority neighborhoods, extensive residential rehabilitation would be unlikely, irrespective of BART. In the Mission District and downtown Richmond, rehabilitation loan activity around stations has been one-third the neighborhood average; only one-sixth the areawide average in Oakland's Fruitvale District.

Preliminary Indications of BART's Impacts on Real Estate Values Around Stations

As discussed previously, the results of the comprehensive study of BART's impacts on property values to be conducted as part of Work Element 13 in the Land Use and Urban Development Project are not currently available. However, a limited study of BART's impacts on property values around four stations prepared for the Joint Development Project, Office of Midtown Planning, City of New York, provides some indication of the pattern and extent of BART's influence on real estate values to date. ** The stations studied were Montgomery, Rockridge, MacArthur and Coliseum.

* John Blayney Associates and David M. Dornbusch & Co., Inc. Study of the Housing Industry. BART Impact Program. Document No. DOT-BIP-WP 37-5-77. (Draft). September, 1977.

Booz, Allen & Hamilton. The Impact of BART on Land Use and Urban Development. (Draft Working Paper). September, 1977. Jefferson Associates, Inc. Impacts of BART on Bay Area Political Institutions. BART Impact Program. Document No. DOT-BIP-TM 32-6-77. May, 1977.

** Gruen Associates, Inc. The Impact of BART on Real Estate Values. A Report Prepared for the Joint Development Project, Office of Midtown Planning. City of New York. April, 1976.

Of the three non-downtown station areas studied, BART is seen to have affected development potential in one of the areas, the Rockridge neighborhood with a relatively small ethnic minority population representation (23.4%).* However, due to the successful campaigns of local residents to obtain downzoning in the area in response to expectations of new development caused by BART, land use values will continue to reflect the demand for existing uses in the area. BART, however, is seen to have had some effect on increasing the value of property, particularly for residential uses within this attractive neighborhood for which BART has added to its generally good accessibility to regional employment centers.

Both the other two Oakland stations studied are located in areas of high ethnic minority concentration — MacArthur (77.3%) and Coliseum (95.4%).** For both these station areas, it has been concluded that BART has had no impact on development potential or real estate values. In both of these physically deteriorating areas with relatively low incomes and rents, any additional accessibility provided by BART has not been sufficient to overcome existing forces in the area which are depressing property values.

Conclusion

Increased real estate values in the vicinity of BART stations would imply the heaviest burden on the elderly and lower-income households, many of which are ethnic minorities, living in rental units in low and moderate cost housing. At this point in the BART Impact Program studies, there is not sufficient evidence to determine if property values have increased substantially around station areas, including those with high concentrations of ethnic minority population subgroups, or that these changes, if they have occurred, are related to BART. A definitive conclusion to this issue must await the findings of the property value study of the Land Use and Urban Development Project. However, the record of actual construction activities around BART stations and the relatively small impact of BART on housing development and rehabilitation activity suggest

*Percent total ethnic minority of population within one-half mile of station. McGuire, Chester. Who Are the Transportation Disadvantaged? BART Impact Program. Document No. DOT-BIP-WP 27-10-77. April, 1976.

** Ibid.

that residential property values have not increased substantially around most non-downtown BART stations as a result of BART. BART's impact on property values is apparently the least in the older, mixed land use urban areas where ethnic minorities live in the greatest concentrations. The limited results of a study of BART's impacts on real estate values around three Oakland station areas supports this tentative conclusion. It is unlikely that subsequent studies will show that significant relocation of lower income tenants has occurred around BART stations as a result of inflation of residential property values related to BART's impacts on development market potential or land use policies.

Has BART encouraged more shopping downtown at the expense of shopping districts in ethnic communities?

Expectations and BART's Use for Shopping

Since BART has increased accessibility to the downtown areas of San Francisco and Oakland more than it has to other activity areas within the BART Service Area, it might be expected that corresponding shifts in shopping patterns have been brought about by BART's introduction into the regional transportation system. In addition to those shopping areas not directly served by BART, other retail areas, such as the Mission District in San Francisco which is served by BART, might be expected to experience loss in shopping activity re-directed to the downtown areas. In the case of the Mission District, once the second largest commercial district in San Francisco, there is some indication that merchants perceive that BART is at least one element contributing to the decline of the area which has been occurring over the course of many years.*

On the other hand, given the relatively low use of BART for shopping trips compared to other modes of travel, the magnitude of BART's impacts on the changing distribution of retail sales may be fairly small. Less than one percent of all weekday shopping trips made in May, 1975 were made on BART (0.6%) — eight times fewer than in other forms of public transit (4.8%).**

* Gruen Associates, Inc. Indirect Environmental Impact. BART Impact Program. (Draft Technical Memorandum). Metropolitan Transportation Commission, Berkeley. January, 1977.

** BART Impact Program, May 1975 Areawide Travel Survey. 1975 BART Passenger Profile Survey. Reported in: PMM & Co. Travel in the BART Service Area. Document No. DOT-BIP-WP 35-3-77. Metropolitan Transportation Commission, Berkeley. September, 1977.

Perceptions of Downtown Oakland Merchants

A somewhat ambiguous picture of BART's impacts on shopping activities in downtown Oakland as perceived by merchants has been obtained in the Institutions and Lifestyles Project interviews with retailers.* Analysis of this survey indicates that a large percentage believe that BART helps downtown Oakland businesses (67%), although only a small percentage believe it has increased the sales of their own businesses (20%). Most observations of positive BART impacts on sales involve reports of increases in sales due to increased foot traffic from BART commuters working in downtown Oakland or from tourists using BART to get to the area. Correspondingly, BART's effects are seen as more substantial by retailers in the immediate vicinity of the downtown stations — particularly the 19th Street station.

An equal number of merchants expressed the belief that BART has encouraged a shift of shopping from suburban commercial areas to downtown Oakland as thought BART takes shoppers away from Oakland to suburbia or downtown San Francisco. In general, many retailers perceive that the completion of the City Center redevelopment program, the completion of the Grove-Shafter freeway in downtown Oakland, and the provision of ample free parking are the most important factors in enhancing the competitiveness of downtown Oakland businesses.

Preliminary Results of Shoppers Survey

In Work Element 9 of the Land Use and Urban Development Project, shifts in shopping activities resulting from BART will be estimated by the analysis of interviews with shoppers intercepted at six different retail area locations in the BART Service Area.** A sample of approximately 500 shoppers is used in the study, half of whom are riders and half of whom represent a random sub-sample.

* Jefferson Associates, Inc. Three Community Case Studies: Impacts of the BART System on Institutions and Lifestyles, BART Impact Program. (Working Note). August, 1977.

** John Blayney Associates and David M. Dornbusch & Co., Inc. Study of Retail Sales and Services, BART Impact Program. Working Paper. Scheduled Submission Date: April 15, 1978.

Since the sample includes substantially more BART riding shoppers than the number of area shoppers who actually use BART, and since the six locations surveyed are all served by BART, BART's impacts on the consumer patterns of the general population are probably overstated by the results of this study.

The preliminary results available at the time of this writing do not permit analysis of intra-regional shifts in retail shopping patterns resulting from BART, i. e., the gain of one area at the expense of another; however, they do suggest that BART is having an impact on increased shopping activity in the San Francisco CBD.* Specifically, the study has found that BART riding shoppers have increased their shopping in downtown San Francisco more than have non-BART riding shoppers. BART is also more of a factor for young shoppers, the unmarried, and those without access to other means of transportation than it is for persons without these characteristics. No significant difference between ethnic minority and majority White shoppers was found in relation to BART's impact on shopping activity. The survey also indicates that shoppers who are relatively long distance commuters are more likely to use BART for shopping than those who are not long distance commuters.

Conclusion

Due to the greater accessibility gains provided by BART for commercial activities located in downtown areas, it might be expected that corresponding shifts in retail shopping patterns have occurred generally to the disadvantage of shopping areas either not served, or served less well by BART. Older urban area commercial districts, such as the Mission in San Francisco where many ethnic minority owned and patronized businesses are located, might lose business to the downtown areas.

Despite the fact that many merchants perceive that BART is strengthening the vitality of the Oakland CBD, BART's impacts on commercial activity appear to have been relatively weak in overcoming other factors which inhibit shopping in the area, namely — development character and relatively poor auto access. In downtown San Francisco,

* Preliminary tabulations of Work Element 9 Shoppers Survey. Land Use and Urban Development Project. James Merchant, David M. Dornbusch & Co., Inc.

there is indication that those consumers that use BART have increased their shopping in downtown San Francisco, but not necessarily at the expense of other areas. Since BART is used by a very small share of the general area population to shop, only about one percent of weekday shopping trips, its impact on the competitiveness of non-downtown shopping districts located in ethnic minority areas is probably relatively minor. A definitive conclusion to this issue must await the complete results of the Land Use and Urban Development Project study of BART's impact on retail sales.

III. IMPLICATIONS

The overall purpose of the ITD Project is to identify the implications for the transportation disadvantaged of the BART impacts, and to draw these in such a manner as to permit their transferability to other major urban areas considering or pursuing development of rapid rail mass transportation systems such as BART. The investigation of six BART-related land use impact issues in this report has resulted in the following initial listing of BART's land use impact implications for the transportation disadvantaged. A complete and finalized identification of implications will be included in the Final Report of the ITD Project. It will include not only land use, but environmental, mobility and economic impact implications as well.

Magnitude of Rapid Rail's Potential Land Use Impacts

The issue statements developed in the Project Implementation Plan of the ITD Project which are the focus of this working paper were considered important due to the expectation that BART's overall urban form-making potential could be substantial. Most of the issues examined in this working paper relate to the concern that the land use impacts of a new rapid rail system in the Bay Area would largely be detrimental within the older urban residential neighborhood where lower income ethnic minorities and other transportation disadvantaged people live in the greatest concentrations. It was feared that the increase in accessibility provided by BART for the outlying suburban residential areas and to the downtown commercial activity centers would contribute to an exodus of middle income households from inner city areas. It was also feared that BART might also undermine the attractiveness of the commercial districts in the older areas less well served by BART than the downtown areas. On the other hand, there was also concern that BART's potential land use impacts around station areas in ethnic minority neighborhoods might be sufficient to induce construction of new non-residential "higher" uses or more costly housing which would, in turn, change the character of these communities and displace lower- and moderate-income residents. Only one of the six issues investigated in this paper relates to the possibility of enhanced neighborhood vitality stemming from BART's land use impacts — increased rehabilitation of properties and provision of streetscape or open space amenities.

The investigation of these issues has been limited by the fact that many of the more relevant work elements of the Land Use and Urban Development Project are not complete at the time of the preparation of this paper. However, from the results of the studies that are currently available, it is clear that BART's overall impact on regional land use activities, as well as on site-specific station areas, has been far less to date than was expected. Despite the relatively large-scale public investment represented by BART, it has not substantially changed the overall accessibility characteristics or the distribution of development potentials in the Bay Area.

Consequently, most of the feared negative land use impacts or anticipated beneficial impacts have not been measured, as of yet, in the study of the BART experience. Greater development activity and continuing population growth observed in the suburban areas, cannot generally be attributed to BART.

Importance of Coordinated Development Planning and Policies

Perhaps the clearest implication emerging from the investigation of BART's land use impacts is that extensive, community-oriented land use planning is required in order to exploit the potential benefits of the relatively small land use impacts that a rapid rail station is likely to provide in older, closer-in urban residential areas. In general, it appears that substantial increase in demand for higher density middle or upper income housing will not be associated with the introduction of a rapid rail system in these areas, since the relatively minimal accessibility gains implied for these sites as residential origin areas do not offset other more important housing market factors in these areas. Similarly, increases in the development of office or other commercial activities in these areas as destinations, would seem to require extensive public policy incentives or redevelopment initiatives to make these older, mixed-use urban areas attractive to such development.

The example of the Mission District in San Francisco indicates that where community interests are organized and articulated, the land use impacts desired by neighborhood residents of any new facility in the older urban residential area is likely to be that of conservation and non-disruptive support for existing land uses. Uncertainty on the part of area residents about BART's effects on the development potential of station areas in the Mission, and the lack of coordinated community-level planning possibly has resulted in a stalemate situation. Constructive neighborhood impacts, which might

have occurred beyond the relatively cosmetic capital improvement amenities provided as part of station area construction, have not been achieved. It is possible that uncertainty about BART's effects is, in part, responsible for the lower rates of rehabilitation that are observed around stations in this area than in comparable neighborhood areas away from BART. Adequate station area planning which reflects neighborhood interests, should be pursued in order to minimize the effects of uncertainty.

Finally, it is clear that in order to preserve and enhance the vitality of urban residential areas in which ethnic minority and lower income households reside in the largest numbers, the introduction of a commuter rapid rail system must be accompanied by other supportive public investments and public policies. Without such support, the beneficial land use impacts of rapid rail transit facilities in these areas may be negligible, if not deleterious.

REFERENCES

1. Urban Dynamics Associates. Project Implementation Plan: Implications for the Transportation Disadvantaged Project. BART Impact Program. Document No. DOT-BIP-PD 30-10-77.
2. Urban Dynamics Associates. Implications of BART's Environmental Impacts for the Transportation Disadvantaged. BART Impact Program. Document No. DOT-BIP-TM 34-10-78. Metropolitan Transportation Commission, Berkeley. January, 1978.
3. Urban Dynamics Associates. Implications of BART's Mobility and Accessibility Impacts for the Transportation Disadvantaged. BART Impact Program. (Draft Technical Memorandum). Metropolitan Transportation Commission, Berkeley. December, 1977.
4. Urban Dynamics Associates. Implications of BART's Economic, Employment and Financial Impacts for the Transportation Disadvantaged. BART Impact Program. (Draft Technical Memorandum). Metropolitan Transportation Commission, Berkeley. December, 1977.
5. Urban Dynamics Associates. Implications of BART's Land Use and Urban Development Impacts for the Transportation Disadvantaged. BART Impact Program. (Working Paper). Metropolitan Transportation Commission, Berkeley. January, 1978.
6. Booz, Allen & Hamilton. The Impact of BART on Land Use and Urban Development Policy. BART Impact Program. Document No. DOT-BIP-WP 41-8-77. Metropolitan Transportation Commission, Berkeley. September, 1977.
7. Booz, Allen & Hamilton. The Impact of BART on Local Government Expenditures, Revenues and Financial Policies. BART Impact Program. Document No. DOT-BIP-WP 31-8-77. Metropolitan Transportation Commission, Berkeley. July, 1977.
8. Gruen Associates, Inc. Indirect Environmental Impact. BART Impact Program. Document No. DOT-BIP-TM 24-4-77. Metropolitan Transportation Commission, Berkeley. January, 1977.
9. Gruen Associates, Inc. The Impact of BART on Real Estate Values. A Report Prepared for the Joint Development Project, Office of Midtown Planning. City of New York. April, 1976.

10. Jefferson Associates, Inc. Impacts of BART on Bay Area Political Institutions. BART Impact Program. Document No. DOT-BIP-TM 32-6-77. Metropolitan Transportation Commission, Berkeley. May 1977.
11. Jefferson Associates, Inc. Minority Transportation Needs Assessment Project: Phase I Report. Metropolitan Transportation Commission, Berkeley.
12. Jefferson Associates, Inc. Three Community Case Studies: Impacts of the BART System on Institutions and Lifestyles. BART Impact Program. (Working Note). Metropolitan Transportation Commission, Berkeley. August, 1977.
13. John Blayney Associates/David M. Dornbusch and Company, Inc. BART's Impacts on Property Values and Rents. BART Impact Program. (Working Paper). Metropolitan Transportation Commission, Berkeley. Submission Date: May 13, 1978.
14. John Blayney Associates/David M. Dornbusch and Company, Inc. Interim Report: Project Findings to Date. BART Impact Program. (Working Note). Metropolitan Transportation Commission, Berkeley November, 1977.
15. John Blayney Associates/David M. Dornbusch and Company, Inc. Program-Wide Case Studies: Findings to Date. BART Impact Program. (Working Note). Metropolitan Transportation Commission, Berkeley. December, 1977.
16. John Blayney Associates/David M. Dornbusch and Company, Inc. Station Area Land Use. BART Impact Program. Document No. DOT-BIP-WP 39-5-77. Metropolitan Transportation Commission, Berkeley. November, 1977.
17. John Blayney Associates/David M. Dornbusch and Company, Inc. A Joint Venture. Study of Household Decisions. BART Impact Program. (Working Paper). Metropolitan Transportation Commission, Berkeley. February, 1978.
18. John Blayney Associates/David M. Dornbusch and Company, Inc. Study of Retail Sales and Services. BART Impact Program. (Working Paper). Metropolitan Transportation Commission, Berkeley. Submission Date: April 15, 1978.

19. John Blayney Associates/David M. Dornbusch and Company, Inc. Study of Workers' Locational Decisions. BART Impact Program. Document No. DOT-BIP-WP 38-5-77. Metropolitan Transportation Commission, Berkeley. November, 1977.
20. John Blayney Associates/David M. Dornbusch and Company, Inc. Study of the Housing Industry. BART Impact Program. Document No. DOT-BIP-WP 37-5-77. Metropolitan Transportation Commission, Berkeley. September, 1977.
21. John Blayney Associates/David M. Dornbusch and Company, Inc. Study of the Office Construction Industry. BART Impact Program. Document No. DOT-BIP-WP 12-8-77. Metropolitan Transportation Commission, Berkeley. August, 1977.
22. John Blayney Associates, Tyler Research Associates. Preliminary Tabulations: Work Element 3, Land Use and Urban Development Project. BART Impact Program. Metropolitan Transportation Commission, Berkeley. January, 1978.
23. McGuire, Chester. Implications for the Transportation Disadvantaged: Research Plan. BART Impact Program. Document No. DOT-BIP-PD 28-10-77. Metropolitan Transportation Commission, Berkeley. April, 1976.
24. McGuire, Chester. Who Are the Transportation Disadvantaged? BART Impact Program. Document No. DOT-BIP-WP 27-10-77. Metropolitan Transportation Commission, Berkeley. April, 1976.
25. McGuire, Chester. The Special Study of Ethnic Minorities in the BART Impact Program. BART Impact Program. Document No. DOT-BIP-PD 28-10-77. Metropolitan Transportation Commission, Berkeley. April, 1976.
26. Preliminary tabulations of Work Element 9 Shoppers Survey. Land Use and Urban Development Project. BART Impact Program. James Merchant, David M. Dornbusch and Company, Inc.
27. Metropolitan Transportation Commission. Land Use Modeling Project: Stage I Findings and State II Implementation Plan. BART Impact Program. July, 1977.
28. BART Impact Program, May 1975 Areawide Travel Survey. 1975 BART Passenger Profile Survey. Reported in: PMM & Co. Travel in the BART Service Area. BART Impact Program. Document No. DOT-BIP-WP 35-3-77. Metropolitan Transportation Commission, Berkeley. September, 1977.

